IITA Bulletin

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News from NASA

Intercenter Working Group Holds Videoconference

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Every other month the Intercenter Working Group (ICWG) holds a videoconference. The ICWG consists of Learning Technologies Project (LTP) and education representatives from ten NASA centers (ARC, DFRC, GSFC, JPL, JSC, KSC, LaRC, LeRC, MSFC, and SSC) and the Remote Sensing Public Access Center. After introductions, which included new staff members at a few of the centers, discussion at the September 10 conference centered on three agenda items. Each center had already reviewed summaries of the activities the other centers are proposing for FY 98.

The first agenda item called for a spokesperson from each center to quickly recap that center's activities, then entertain questions and comments. A number of potential areas for collaboration were discovered.

The largest area of potential collaboration was also the second agenda item. The Learning Technologies Channel (LTC), an Internet-based infrastructure for content delivery, offers the possibility for any center working with a local population to significantly broaden its reach. Representatives from most of the centers had participated in demonstration LTC events in the days leading up to the videoconference, and the group discussed their experiences, particularly in receiving video and audio over the Net.

Finally, the group participated in the fine-tuning of LTP's FY 98 metrics.

Management has since begun working out a simple method for metrics collection. The next Intercenter Working Group videoconference is scheduled for November 5 from 8:00 to 10:00 a.m. Pacific time.

New Web Guidelines for LTP

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As the IITA project draws to a close and Learning Technologies Project (LTP) begins, we all need to think about how we identify our support and funding. LTP has developed a set of guidelines to help projects identify their Web site funding and provide linkage to the correct supporting project Web site. The guidelines can be found online at **http://quest.arc.nasa.gov/ltpmgmt/guidelines/web.html.** If you don't have the password for the LTP management pages on Quest, please contact Susan Lee (slee@mail.arc.nasa.gov).

In short, the guidelines state that all LTP-funded sites should provide an acknowledgment of LTP funding and a link to the new LTP Web site, which is under development and will reside at **http://learn.ivv.nasa.gov.** Since the IITA project will have been completed by the end of FY 97, there is no requirement for projects to acknowledge or link to IITA.

Please take a look at these guidelines and make any required changes to your Web site(s) soon, preferably before the start of the new fiscal year, October 1. If you have any questions, you can contact David Brown (dhbrown@rspac.ivv.nasa.gov) or your LTP management.

News Bytes

"America Goes Back to School" Initiative Connects NASA Experts, Classrooms, and the Web

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NASA is joining the Department of Education in supporting the 1997 "America Goes Back to School" initiative. This initiative will focus attention on improving education across America during the back-to-school time of August through October. More information is available online at **http://www.ed.gov/Family/agbts.**

To highlight NASA's support of excellence in education using innovative technology, the Internet will be used to connect educators and students to NASA experts in a series of five two-hour Webchats during the last week of September. These will be hosted on the Learning Technologies Project's Quest server. More details on the events and instructions on how to participate can be found at **http://quest.arc.nasa.gov/school97.**

The topics will address each NASA enterprise according to the following schedule:

Monday, September 29. "NASA Scientists and Engineers." Meet two women who work at NASA and learn how their talents help make ideas come alive and contribute to a better understanding of our universe.

News Bytes (Cont.)

* 12:00-1:00 p.m. Meet: Yvonne Pendleton. Yvonne is an astrophysicist at Ames Research Center.
(Moderator: Keith Mahoney)

* 1:00-2:00 p.m. Meet: Bernadette Luna. Bernadette is a research scientist in the area of extravehicular activity (space walks) at Ames Research Center.
(Moderator: Keith Mahoney)

Tuesday, September 30. "Exploring Mars." Two engineers will talk about how they have helped make the Pathfinder mission to Mars one of the most exciting and successful NASA missions ever.

* 12:00-1:00 p.m. Meet: Rob Manning. Rob is the flight systems chief engineer for Pathfinder at Jet Propulsion Laboratory.
(Moderator: Sandy Dueck)

* 1:00-2:00 p.m. Meet: Bridget Landry. Bridget is deputy uplink systems engineer for Pathfinder at Jet Propulsion Laboratory.
(Moderator: Sandy Dueck)

Wednesday, October 1. "Working in Space." Talk with some of the astronauts who fly in the shuttle. They will tell you about their missions and how they conduct some of the most fascinating experiments ever done in space.

* 12:00-1:00 p.m. Meet: Janice Voss. Janice is an astronaut (since 1991) at Johnson Space Center.
(Moderator: Oran Cox)

* 1:00-2:00 p.m. Meet: Robert Curbea. Robert is an astronaut (since 1995) at Johnson Space Center.
(Moderator: Oran Cox)

Thursday, October 2. "Amazing Aeronautics." Learn how NASA scientists and engineers work every day to create out-of-this-world aircraft to make airplanes better, faster, and cheaper.

* 12:00-1:00 p.m. Meet: Frank Quinto. Frank is a test engineer at the fourteen-by-twenty-two-foot subsonic wind tunnel at Langley Research Center.
(Moderator: Susan Lee)

* 1:00-2:00 p.m. Meet: Mina Cappuccio. Mina is an engineer in the High Speed Aerodynamics Branch at Ames Research Center.
(Moderator: Susan Lee)

Friday, October 3. "Getting to Know Planet Earth." Find out how NASA scientists work with others around the world to study our changing planet and how human beings contribute to those changes.

* 12:00-1:00 p.m. Meet: Jack Kaye. Jack is the manager of the Atmospheric Chemistry Modeling and Analysis Program at NASA Headquarters. He will discuss Earth system science.
(Moderator: Keith Mahoney)

* 1:00-2:00 p.m. Meet: Eric Lindstrom. Eric is the physical oceanography program manager at NASA Headquarters. He will discuss the 1997-98 El Niño.
(Moderator: Keith Mahoney)

Each NASA center is encouraged to support and publicize this activity.

This bulletin will also be available in Adobe Acrobat format on the Developers' Workshop Web site at: **http://developers.ivv.nasa.gov/collab/pubs/bulletin/**

If you would like to be on the IITA Bulletin mailing list, please send e-mail to Scott Gillespie at: sgillespie@rspac.ivv.nasa.gov, or write to: BDM/RSPAC, 100 University Drive, Fairmont, WV 26554. Phone: (304) 367-8324, fax: (304) 367-8211.

JavaShop Now Open for Business; "The Scroller" Is First Featured Product

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The Remote Sensing Public Access Center's (RSPAC) Web wizards are pleased to announce the opening of JavaShop, an online help center for persons and projects who are building their own Web sites.

Each month, JavaShop will introduce a new RSPAC-designed and Java-supported applet — excellent tools to improve a Cooperative Agreement Team's online look and feel. All the applets provided in JavaShop are easily customized so that they can be incorporated into any Web site. RSPAC will add at least one new applet each month.

JavaShop is located on the Developers' Workshop site and can be found directly at **http://developers.ivv.nasa.gov/tech/javashop**.

The Scroller

The first applet to debut in JavaShop is "The Scroller," which enables a Web site to provide a window with scrolling text containing HTML links.

The Scroller "gives you the ability to add easy interactivity to your Web site," said RSPAC's Ian Straub, who, after viewing a similar applet elsewhere, expanded upon the idea to offer more options. Some of those options include:

* scrolling speed control
* ability to adjust the text color, font, and font size
* ability to insert hypertext links directly into the scrolling text
* ability to pause the scrolling text at times for better readability
* easy configuration of the scrolling text window to any size

For Web sites looking to call attention to certain items, The Scroller is the perfect tool, "Any time there's something moving on your screen, it naturally grabs your eye," said Straub. "The Scroller is definitely an attention getter."

The Scroller was developed by John B. Hinkle, RSPAC Web programmer, and RSPAC intern Rob Harman, of West Virginia University.

To find out more about The Scroller, including how to incorporate it into your Web site, visit JavaShop at **http://developers.ivv.nasa.gov/tech/javashop**.

After you have used any of the JavaShop products, please let the RSPAC Web staff know about what you liked and disliked and any features you would like to see added. Send comments to JavaShop@rspac.ivv.nasa.gov.

CAT in the Spotlight

ForNet Introduces Web-Based Spatial Data Tools

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The ForNet project at the University of Minnesota is one of five land management projects under the Public Use of Remote Sensing Data program. ForNet's primary collaborator in the project has been the Minnesota Department of Natural Resources, Division of Forestry (DNR-Forestry). The original intent of ForNet was to discover problem areas within DNR-Forestry related to the use of spatial data for management decision making, and to create and deliver solutions to appropriate problems using wide-area networks, particularly the Internet. Fairly early in the project it became clear that the number of applications that could be developed to address needs was nearly boundless, but the tools and mechanisms for application generation were lacking. It was determined that collateral development of basic software tools (digital library tools) through which application solutions could evolve was critical to meeting the original objectives of ForNet. A significant outcome of the ForNet project has been the development of two flexible spatial data manipulation and display tools that run over the World Wide Web (WWW) — MapServer and ImageView. These software tools, along with representative demonstration applications built using the tools, are discussed below.

Both MapServer and ImageView have evolved significantly over time, to some degree paralleling developments on the WWW. Original incarnations of the tools were based on passing user requests to large, canned, server-residing spatial data analysis and display packages such as ESRI's Arc/Info and ERDAS Imagine. The overhead associated with such an approach generally results in unsatisfactory response times. Further, dependence on these large packages results in solutions that simply aren't viable to a wide user audience. ForNet development quickly moved from such an approach to one where complete package solutions could be offered.

MapServer is a CGI-based gateway for accessing spatial and attribute data contained in ESRI shapefiles. The shapefile format specification and libraries to read/write the files are publicly available. Although the primary means of creating shapefiles from existing GIS databases is packages such as Arc/Info, other vendors are expected to provide import and export support for the portable shapefile format.

MapServer uses two template files to define a particular application. Map files are used to define how a group of shapefiles (i.e., GIS layers) will be combined to create a graphic. Layer properties such as color, symbolization, and annotation can be set. Similarly, layout files are used to define the user interface using HTML. A layout file acts as a template for subsequent calls to MapServer. After each call, a variety of parameters can be changed in the layout template and the process can be repeated. Although primarily developed for interactive (pan/zoom) uses, MapServer is configurable to return general formats. MapServer supports "formless" graphics, allowing calls to be embedded in HTML <img> tags. MapServer can also return a URL, acting as front-end to other applications by passing map coordinates.

MapServer also supports the definition of query layers, which allow attributes to be accessed using a map-based interface. MapServer searches the query layer's shapefile and generates a display. Multiple instances of basic query commands are recognized to provide flexibility. Display format is again controlled by a template so that elaborate presentations can be made.

MapServer will run in conjunction with Unix and Windows NT servers. The package has been adopted for use by groups around the world. One popular ForNet demonstration application of MapServer is an aerial photograph browser, which can be seen at **http://www.gis.umn.edu/fornet/ids/photos/**. The application allows map-based access to a large database of 1:15840 color infrared photography. When this service was announced in local newspapers, a ForNet server generated several thousand maps a day.

ForNet ImageView provides a gateway to eight-bit truecolor, pseudocolor, or grayscale ERDAS Imagine files. ImageView was built in part using the ERDAS Developer's Toolkit. The Imagine file format was chosen for a number of reasons. First, its structure allows for the storage of multiple bands of data. Given that most satellite-derived imagery used currently is multispectral, this is a necessity. Second, the format allows for coordinate system and projection information to be stored with the data. Third, the format allows for the addition of pyramid layers.

Pyramid layers are reduced-resolution versions of raw imagery. Sub-sampled views of an image can be quickly derived from these layers, allowing for rapid display at any resolution.

ImageView consists of two components: the image server (a CGI program built on the MapServer framework to handle user requests) and a utility program designed to create WWW-compatible graphics from Imagine files. The utility program uses ERDAS Developer's Toolkit libraries to sample raw images as specified by the user. Parameters such as band specification, data scaling, and areal extent can be set by the user or by front-end software. ImageView also allows browsing of multiple images simultaneously. Users can examine a series of images while controlling the spatial extent of the images with a single mouse click.

ImageView runs only under the Unix operating system. It is standalone — ERDAS Imagine need not be installed on an ImageView server. ForNet staff have created a demonstration application of ImageView that allows query, browsing, and manipulation of multitemporal Landsat Thematic Mapper (TM) scenes of the state of Minnesota at **http://www.gis.umn.edu/fornet/ids/imageview/tm/tmsearch_sqs.html**. Related applications allow the downloading of user-specified regions of data in a format compatible with GIS software packages.

An early vision of ForNet involved providing the capability to work with vector data (data from a GIS) and raster data (satellite image data) simultaneously. This was difficult to accomplish flexibly and efficiently using server-side WWW tools. The advent of Java changed that. Java applets have been used to enhance a number of ForNet applications of MapServer and ImageView, and to effectively integrate the two software tools. Again, an evolution took place. Early attempts focused on replacing MapServer and ImageView capabilities with pure data (vector and raster) servers, building all display and manipulation capability with Java. While this reduced the number of server transactions, the speed, size, and immaturity of Java (as well as the potential for heavily burdening clients) turned ForNet

away from such a solution. Current efforts focus on building small, flexible applets that add capability to the application's user interface or manage interaction with server-side tools.

An example of extending capability through Java is the ForNet demonstration application ForestView, at **http://www.gis.umn.edu/fornet/gds/forestview/lakecity.html**. ForestView allows a DNR-Forestry field forester to easily access and view spatial and attribute data concerning the lands for which (s)he is responsible. Since DNR-Forestry databases cover only agency lands, broader landscape issues are sometimes difficult to visualize/address with only those data. ForestView assists in overcoming that problem by providing a backdrop of user-selected satellite imagery that can be effective in placing DNR-Forestry lands in context.

Nothin' but Net

How to Add Movies and Sound to Your Project's Web Site

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Have you ever wondered how to get movies and sound in your Web pages? It's easier than you may think.

Whether your viewers are using Netscape or Internet Explorer, they will need a plug-in to view movies. QuickTime movies embedded into Web pages require the QuickTime plug-in, which can be downloaded from the Apple QuickTime homepage at **http://quicktime.apple.com**. MPEG movies embedded into Web pages require an MPEG player plug-in, which can be downloaded from the Internet.

Embedding can be accomplished by using the EMBED tag. Both QuickTime and MPEG movies use the same EMBED tag, but the QuickTime movies allow much more flexibility.

To embed an MPEG movie in a Web page, place the EMBED tag, followed by the source of the MPEG movie, on the

The ForNet software tools, along with the Java extensions to them, have wide applicability for building WWW-based spatial data delivery solutions. All ForNet software is distributed free of charge. As the ForNet project draws to a close, staff are focusing on bulletproofing the download, installation, and use of these tools. ForNet was meant to be an applied development project, and this objective is being met as demonstration applications are moved to DNR-Forestry servers and made operational. Four principal applications will be fully populated with Minnesota-wide data by the end of 1997. These results have been truly gratifying.

page. Remember to include the HEIGHT and WIDTH tags. Below is an example of the tag:

<EMBEDSRC="filename.mpg"
HEIGHT=150 WIDTH=125>.

QuickTime is the type of movie most commonly embedded on Web pages. Unlike MPEG, QuickTime allows control of the way the movie is displayed. Below is a list of tags (and explanations) which can be used to change a movie's appearance.

HEIGHT= specifies the height of the movie in pixels.

WIDTH= specifies the width of the movie in pixels.

VOLUME= sets the volume of the audio (if available) in the movie being played. The value range is 0-256, with 256 being the maximum volume level. If this tag isn't included, the value will be set to 256.

AUTOPLAY= will cause the movie to start playing automatically if set to TRUE. If this tag isn't included, the value will be set to FALSE.

CONTROLLER= sets the visibility of the movie controller. When including this tag, you have to add an additional twenty-four pixels to the

Nothin' but Net (Cont.)

HEIGHT and WIDTH tags. If this tag is not included, the default value will be set to FALSE.

LOOP= will make the movie play continuously. If this tag is not included, the default value will be set to FALSE.

PLUGINSPAGE= will allow you to include a URL so that the user can get the appropriate plug-in if it is not installed. If you want to include this tag, the URL to download the software is **http://quicktime.apple.com**.

Below is an example of how you would implement the tag options listed above. This example sets the volume of the movie to 115, will display the movie controller, and will repeatedly play the movie until the stop button is pressed.

```
<EMBED SRC="filename.mov"
VOLUME=115
AUTOPLAY=true
CONTROLLER=true
LOOP=true
HEIGHT=150
WIDTH=125>
```

It is also important to consider page size. Most people don't like to be surprised with a large movie that is included in a Web page, just as they don't like to wait to download large graphics. The best way to eliminate a visitor's frustration is to use a movie that is small in byte size.

Another great way to spice up a Web page is to include a sound to be played when that page is loaded. The tags used for adding sound to a document are the EMBED tag (Netscape) and the BGSOUND tag (Internet Explorer).

When a user visits a page with the BGSOUND tag, sound will start playing automatically. The only feature that can be modified is the LOOP tag, which specifies the number of times the sound file will be played. The LOOP tag can be specified as any positive number or -1, which equals infinite. This tag must be included between <HEAD> and </HEAD>. Below is an example of the BGSOUND tag set to play three times.

```
<BGSOUND SRC=filename.ext LOOP=3>
```

Netscape's EMBED tag is slightly different from the BGSOUND tag. Its attributes can be used to play sound when the page is loaded or to allow users to decide whether or not they would like to hear the sound. The EMBED tag will allow you to place the movie controller anywhere on the page, unlike the BGSOUND tag. The tags (and explanations) for playing sound using the EMBED tag are listed below.

AUTOSTART= will cause the sound to start playing automatically if set to TRUE. If this tag isn't included, the value will be set to FALSE.

LOOP= will make the sound play continuously until the stop button is pressed on the controller. The value of this tag can be either an integer, true, or false. A number of -1 is equal to infinite.

HIDDEN= will hide the controller. If this tag isn't added, the controller will be displayed. Note that if the HIDDEN= tag isn't included you have to include the HEIGHT and WIDTH tags.

HEIGHT= must be set to 60 pixels.

WIDTH= must be set to 145 pixels.

Below is an example of the EMBED tag used to play sound. This example shows the sound controller, will automatically start after the file has completely downloaded, and plays three times.

```
<EMBEDSRC=filename.ext
AUTOSTART=true
HIDDEN=false
LOOP=3
HEIGHT=60
WIDTH=145>
```

If you have decided to include sound in your Web pages, you need to consider the file formats. The most popular formats used today are the MIDI (.mid) and WAV (.wav) formats. The MIDI file format offers the best quality, but the files are usually very large. The WAV file format is the most commonly used, but it doesn't have the sound quality of the MIDI, and the file size is generally smaller. Just as you limit the size of graphics on a page, you should limit sound files to about 50K. This will allow the sound to be downloaded and played before the visitor leaves the page.

Now that you know how to set up a Web page with movies and sound, you will be able to design a site that will make a lasting impression.

All about CATs

Athena Holds Workshops, Looks Toward the Future

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In July, Athena organized two weeks of writing workshops during which twenty teachers from partner districts wrote new instructional material for use in the coming year. Most of the teachers had been Athena pilot teachers in years past and were familiar with the needs of the program. The educators decided to write for each of four grade levels: high school (9-12), middle school (6-8), intermediate (4-6), and primary (K-3). Topics selected for the different levels were real-time weather prediction, weather concepts, whale migration and ocean color, and wetlands for the younger set, respectively. These topics enhance and support lessons already in use.

The Athena educational coordinator facilitated the workshops, while Lorraine Johnson and Hugh Anderson of SAIC provided scientific expertise. In addition, Dr. Alan Nelson from the Goddard Space Flight Center (GSFC) RSD project visited for three days and explained the importance that NASA places on the IITA projects. Alan also showed some very interesting images of global atmospheric circulation prepared by GSFC. The workshops produced an impressive amount of writing that has been edited into Athena lessons. SAIC will post this new material to the Athena servers during the month of September.

All about CATs (Cont.)

A determination has been made for the continuation of Athena for the coming year, after the initial period of the cooperative agreement has ended. The formal collaboration between SAIC and educator partners is complete. RSPAC has agreed to continue to host the Athena products, which are NASA property and in the public domain, at the same URL, which is **http://www.athena.ivv.nasa.gov/**. SAIC will maintain these materials during the 1997-98 school year and continue to mirror the RSPAC server at the two sites maintained by the Office of the Superintendent of Public Instruction in Washington. Additional materials will be added and the structure of the site will be edited. It is anticipated that many education partners of the past year will continue to use these materials and may wish to provide material to add to the site.

LDAPS Has New Kit for Software, Looks Toward Another School Year

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The LEGO Data Acquisition and Prototyping System (LDAPS) at Tufts University has seen a lot of cleaning up and re-organizing after successful summer workshops. A new facility is also being constructed at Tufts, so the LDAPS project will see a whole new space. Teachers are already telling us how excited they are to start doing engineering projects with their students.

The newest kit from LEGO — the programmable brick (or P-Brick) — is now programmable with LDAPS software. The team is working on standalone applications that run on the computer without having LabVIEW installed. These applications vary in difficulty so that students graduate from one level of control to another as they move from grade to grade.

A copy of the LEGO-VERNIER adapter has been given to LEGO for testing and demonstration. This adapter will allow high schools that already use vernier sensors for science experiment data-taking to use the LEGO control box and LDAPS software and materials.

LEGO kits that were on backorder were shipped to Tufts and distributed to teachers.

Cool Links

Cool Space Science Site

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The Applied Physics Laboratory of Johns Hopkins University (JHU/APL) is working on a wide range of space and Earth sciences projects. They have an excellent Web site describing the projects and the science, including some unique images.

Projects at JHU/APL include the Near Earth Asteroid Rendezvous (NEAR) mission, which this past summer sent back spectacular images of asteroid Mathilde; a magnetospheric imaging instrument for the Cassini spacecraft, which will be launched later this year to Saturn; the Advanced Composition Explorer (ACE), launched on August 25, 1997; and the Far Ultraviolet Spectroscopic Explorer (FUSE), to be launched in 1998.

The JHU/APL site is at **http://sd-www.jhuapl.edu/ACE/ACE_FactSheet.html**.

## Cool Earth Science Site

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Need cartographic software? Check out the US Geological Survey's (USGS) Mapping Science Software site at **http://mapping.usgs.gov/www/products/software.html**.

Did you know that USGS maintains a collection of public domain software? These programs are for cartographic mapping, map production and revision, geospatial metadata, and mapping products access. All software has been used by the USGS for various applications, and all is available gratis!

This site provides links to other sites that have software for cartographic applications, including topo mapping, triangulation, revision and product generation, and tools for implementing the Spatial Data Transfer Standard (SDTS).

Other links are provided to software for importing, manipulating, and displaying USGS digital data, and to sources of programs for geologic mapping, water resources applications, and for creating metadata.

If you need to map it, the software you need can probably be found through this site.
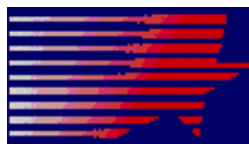
September 1997

IITA Bulletin

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